State/Industry Ambient Monitoring Network

Air Quality Report

4th Quarter 2000

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North Dakota Department of Health

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SECTION ONE

DISCUSSION OF

MONITORING RESULTS

Sulfur Dioxide (SO_2)

There were no exceedances of the state or federal standards during the quarter. The maximum 1-hour concentration was 161 ppb on November 7 at Mandan - SPM; the maximum 3-hour concentration was 126 ppb on November 7 at Mandan - SPM; and, the maximum 24-hour concentration was 58 ppb on November 19 at Mandan - SPM. All sites achieved at least an 80% data recovery for the period except Sharon.

Sharon failed to achieve to achieve 80% data recovery due to an equipment malfunction.

The Sharon site was terminated effective December 31 except for the $PM_{2.5}$ sampler. The site was established to collect 5 years of data to use as background data for the eastern part of the State.

Sulfur Dioxide (SO_2) 5-Minute Average

The maximum 5-minute concentration was 297 ppb on December 21 at Mandan - SPM.

Ozone (O_3)

There was no exceedance of the ozone standard during the quarter. The maximum observed 1-hour concentration was 56 ppb on October 21 at Hannover. The 4th highest 8-hour concentration was 41 ppb on October 21 at Hannover. All sites achieved at least an 80% data recovery for the period operated.

The Sharon site was terminated effective December 31 except for the $PM_{2.5}$ sampler. The site was established to collect 5 years of data to use as background data for the eastern part of the State.

Nitrogen Dioxide (NO_2)

The maximum 1-hour concentration observed was 47 ppb on December 14 at Fargo NW. All sites achieved at least an 80% data recovery for the period operated.

The Sharon site was terminated effective December 31 except for the $PM_{2.5}$ sampler. The site was established to collect 5 years of data to use as background data for the eastern part of the State.

Ammonia (NH_3)

The ammonia analyzer was officially started on November 17. The maximum 1-hour average was 99.1 ppb on November 29 at Beulah - North. An 80% data recovery was achieved for the period operated.

The data will be used as part of the ambient data input used by the newer dispersion models.

Inhalable Continuous $PM_{2.5}$ Particulates

The maximum 1-hour concentration was 144.3 $\mu g/m^3$ on November 29 at Beulah - North; the maximum 24-hour concentration was 33.4 $\mu g/m^3$ on November 29 at Beulah - North. All sites achieved at least an 80% data recovery for the period operated..

Inhalable FRM $PM_{2.5}$ Particulates

The maximum 24-hour average concentration was 27.5 $\mu g/m^3$ on December 14 at Grand Forks - North. All sites achieved at least an 80% data recovery for the period operated.

Inhalable PM_{10} Particulates

There was no exceedance of the 24-hour standard during the quarter. The maximum 24-hour average concentration was 25.4 $\mu g/m^3$ on December 14 at Fargo NW. An 80% data recovery was achieved for the period operated.

The PM_{10} sampler was terminated in Fargo and moved to Bismarck effective December 31.

Inhalable PM_{10} Sulfates (SO_4)

The purpose for sulfate analysis is to aid the Department in assessing the impact of SO_2 emissions on inhalable particulate concentrations and visibility. The maximum 24-hour PM_{10} sulfate concentration was 3.7 $\mu g/m^3$ on December 14 at Fargo NW. An 80% data recovery was achieved for the period operated.

PM_{10} Sulfate/PM_{10} Analysis

The PM_{10} sulfate/PM_{10} total mass tables present statistics for PM_{10} sulfate and PM_{10} total mass when both concentrations are greater than the respective minimum detectable concentration: 0.5 $\mu g/m^3$ for PM_{10} sulfate analysis; 4 $\mu g/m^3$ for PM_{10} total mass. Statistics for the ratio are produced by evaluating the ratio of the PM_{10} sulfate concentration to the PM_{10} total mass concentration for each data pair. In the individual summaries, one-half of the minimum detectable concentration is substituted for those concentrations less than the minimum detectable value. However, when the PM_{10} total mass concentration is less than 4 $\mu g/m^3$, the PM_{10} sulfate concentration can be higher than the PM_{10} total mass concentration. This is because of the variability in the sulfate analysis procedure at low concentrations. Therefore, when calculating the ratio of PM_{10} sulfate concentration to PM_{10} total mass concentration, only data pairs where both the PM_{10} sulfate and PM_{10} total mass concentrations are greater than the minimum detectable concentrations are used. When the ratio is multiplied by 100, it becomes the percentage of total mass which is sulfate. The maximum 24-hr PM_{10} Sulfate/PM_{10} total mass ratio was 0.197 (19.7%) on December 26 at Fargo NW. The average ratio was 0.097 (9.7%) at Fargo NW.

SECTION TWO

AMBIENT AIR QUALITY DATA

SUMMARIES

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Sulfur Dioxide (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MAXIMA 1 - HOUR 1ST MM/DD/HH	1 - HOUR 2ND MM/DD/HH	3 - HOUR 1ST MM/DD/HH	3 - HOUR 2ND MM/DD/HH	24 - HOUR 1ST MM/DD	24 - HOUR 2ND MM/DD	ARITH MEAN	1HR #>273	24HR #>99	% >MDV
Amerada Hess - Tioga #1	2000	OCT-DEC	2148	53 11/04/13	25 11/04/14	31 11/04/14	14 10/23/11	10 11/04	6 10/23	1.6			17.0
Amerada Hess - Tioga #3	2000	OCT-DEC	2190	63 12/28/10	55 11/02/09	43 12/07/08	36 12/20/23	18 10/22	17 12/20	3.4			29.0
Bear Paw - MGP #3	2000	OCT-DEC	2193	101 11/28/11	17 12/10/11	39 11/28/11	9 12/22/02	6 11/28	5 12/22	1.4			12.2
Bear Paw - MGP #5	2000	OCT-DEC	2189	17 12/15/05	14 12/15/04	13 12/15/05	10 12/24/05	5 12/15	4 12/24	1.3			13.2
Beulah - North	2000	OCT-DEC	2195	29 10/18/10	26 10/07/15	14 10/18/11	14 12/16/14	6 12/15	4 12/31	1.6			23.7
DGC #12	2000	OCT-DEC	2171	33 10/07/15	26 10/19/11	19 12/16/14	18 10/07/17	7 12/15	7 12/16	2.4			58.4
DGC #14	2000	OCT-DEC	2130	28 10/09/10	24 10/27/05	15 10/09/11	14 10/08/11	4 11/03	4 12/15	1.5			14.6
DGC #16	2000	OCT-DEC	2120	29 10/24/19	27 10/27/21	18 10/24/20	15 12/16/14	6 10/11	6 12/15	1.8			22.9
DGC #17	2000	OCT-DEC	2142	27 12/13/06	23 12/13/07	23 12/13/08	14 12/16/14	7 12/13	5 12/15	1.4			10.8
Dunn Center	2000	OCT-DEC	2192	26 12/13/08	24 12/13/09	15 12/13/11	15 12/15/05	8 12/13	8 12/15	1.4			19.4
Fargo NW	2000	OCT-DEC	2194	9 12/30/20	8 12/28/02	6 12/28/02	6 12/30/23	3 11/14	3 12/31	1.2			14.7
Hannover	2000	OCT-DEC	2194	22 10/27/12	22 10/27/13	17 10/27/14	12 12/16/14	5 12/11	5 12/15	1.8			35.4
Mandan - SPM	2000	OCT-DEC	2196	161 11/07/16	152 12/21/08	126 11/07/17	123 11/07/14	58 11/19	53 11/07	9.4			53.2
Mandan NW - SPM	2000	OCT-DEC	2194	106 10/21/01	91 10/27/21	66 10/21/02	57 10/27/23	16 10/21	13 10/27	3.7			55.7

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : SULFUR DIOXIDE (ppb)

				MAXIMA									
				1 - HOUR		3 - HOUR		24 - HOUR					
LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD	2ND MM/DD	ARITH MEAN	1HR #>273	24HR #>99	% >MDV
Sharon	2000	OCT-DEC	1205 ***	4 11/17/02	3 11/17/01	3 11/17/02	2 11/17/11	2 11/17	1 11/19	1.0			1.9
TRNP - SU (Painted Canyon)	2000	OCT-DEC	2193	9 12/14/21	9 12/14/22	8 12/14/23	7 12/15/02	3 12/15	2 12/28	1.2			11.9
White Shield	2000	OCT-DEC	2196	29 12/15/07	25 12/13/05	20 12/13/08	18 12/13/14	12 12/13	6 12/15	1.6			15.9

The maximum 1-hour concentration is 161 ppb at Mandan - SPM on 11/07/16
The maximum 3-hour concentration is 126 ppb at Mandan - SPM on 11/07/17
The maximum 24-hour concentration is 58 ppb at Mandan - SPM on 11/19

* The air quality standards are:
  STATE Standards -
    1) 273 ppb maximum 1-hour average concentration.
    2) 99 ppb maximum 24-hour average concentration.
    3) 23 ppb maximum annual arithmetic mean concentration.

  FEDERAL Standards -
    1) 500 ppb maximum 3-hour concentration not to be exceeded more than once per year.
    2) 140 ppb maximum 24-hour concentration not to be exceeded more than once per year.
    3) 30 ppb annual arithmetic mean.

*** Less than 80% of the possible samples (data) were collected.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Sulfur Dioxide 5-Minute Averages (ppb)

LOCATION	YEAR	PERIOD	OBS	5 - M I N U T E M A X I M A 1ST	DATE MM/DD/HH	2ND	DATE MM/DD/HH	3RD	DATE MM/DD/HH	# HOURS >600	% >MDV
Bear Paw - MGP #3	2000	OCT-DEC	2193	286	11/28/11	93	11/28/10	46	12/10/11	0	20.9
Bear Paw - MGP #5	2000	OCT-DEC	2189	25	10/10/08	25	10/10/09	23	10/24/08	0	22.5
Beulah - North	2000	OCT-DEC	2195	48	10/18/12	44	10/27/01	42	10/15/10	0	34.5
Dunn Center	2000	OCT-DEC	2192	35	12/13/08	35	12/13/09	22	12/13/11	0	31.7
Fargo NW	2000	OCT-DEC	2194	9	12/30/20	8	12/28/02	8	12/30/21	0	14.7
Hannover	2000	OCT-DEC	2194	52	11/30/15	47	11/30/16	44	10/04/09	0	44.7
Mandan - SPM	2000	OCT-DEC	2196	297	12/21/08	234	12/09/23	197	11/07/16	0	66.2
Mandan NW - SPM	2000	OCT-DEC	2194	130	10/21/01	121	10/27/22	120	10/21/00	0	74.5
Sharon	2000	OCT-DEC	1205	4	11/17/02	3	11/17/01	3	11/17/03	0	1.9
TRNP - SU (Painted Canyon)	2000	OCT-DEC	2193	9	12/14/21	9	12/14/22	8	12/14/20	0	11.9

The maximum 5-minute concentration is 297 ppb at Mandan - SPM on 12/21/08

* No Standard is currently in effect:

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Ozone (PPB)

				MAXIMA							
				1 - HOUR		8 - HOUR					
LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD/HH	2ND MM/DD/HH	3RD MM/DD/HH	4TH MM/DD/HH	1HR #>120	8HR #>80
Beulah - North	2000	OCT-DEC	2194	54 10/21/14	53 10/21/15	50 10/21/11	40 10/21/10	40 10/21/09	40 10/21/12		
Dunn Center	2000	OCT-DEC	2198	52 10/21/15	51 10/21/14	46 10/21/10	40 10/21/09	40 10/21/08	40 10/21/11		
Fargo NW	2000	OCT-DEC	2195	45 10/19/14	44 10/19/15	38 11/20/03	37 11/20/02	37 11/20/01	37 11/20/00		
Hannover	2000	OCT-DEC	2195	56 10/21/14	55 10/21/13	51 10/21/11	41 10/21/10	41 10/21/09	41 10/21/12		
Sharon	2000	OCT-DEC	2197	46 10/11/15	46 10/11/16	40 10/11/12	38 10/11/11	38 10/11/10	38 10/11/13		
TRNP - SU (Painted Canyon)	2000	OCT-DEC	2196	48 10/21/13	48 10/21/14	45 10/21/10	41 10/21/09	41 10/21/11	41 10/21/08		

The maximum 1-hour concentration is 56 ppb at Hannover on 10/21/14
The 4th highest 8-hour concentration is 41 ppb at Hannover on 10/21/12

* The air quality standards for ozone are:
STATE - 120 ppb not to be exceeded more than once per year.

FEDERAL - Fourth highest daily maximum 8-hour averages for a 3-year period not to exceed 80 ppb.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Nitrogen Dioxide (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MAXIMA 1-HOUR 1ST MM/DD/HH	MAXIMA 1-HOUR 2ND MM/DD/HH	ARITH MEAN	% >MDV
Beulah - North	2000	OCT-DEC	2189	32 11/29/17	27 11/29/16	3.5	85.1
DGC #12	2000	OCT-DEC	2161	25 11/29/16	23 11/29/15	3.6	88.8
DGC #17	2000	OCT-DEC	2128	22 10/25/17	22 12/27/15	3.0	82.8
Dunn Center	2000	OCT-DEC	2185	16 12/15/03	15 12/15/05	1.7	42.6
Fargo NW	2000	OCT-DEC	2190	47 12/14/06	38 12/14/05	7.8	85.9
Hannover	2000	OCT-DEC	1964	21 11/29/15	19 11/21/00	2.6	71.9
Sharon	2000	OCT-DEC	2194	15 12/28/01	15 12/28/03	2.3	62.5

The maximum 1-hour concentration is 47 ppb at Fargo NW on 12/14/06

* The air quality standards are:
STATE - 53 ppb maximum annual arithmetic mean.

FEDERAL - 53 ppb annual arithmetic mean.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : AMMONIA (PPB)

				M A X I M A 1 - HOUR					
LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1ST MM/DD/HH	2ND MM/DD/HH	3RD MM/DD/HH	4TH MM/DD/HH	5TH MM/DD/HH	6TH MM/DD/HH
Beulah - North	2000	NOV-DEC	1052	99.1 11/29/15	90.6 11/29/16	83.9 11/29/14	37.9 11/29/13	6.3 12/07/08	5.5 12/18/03

The maximum 1-hour concentration is 99.1 ppb at Beulah - North on 11/29/15

* No standard is currently in effect.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable Continuous $PM_{2.5}$ ($\mu g/m^3$)

				M A X I M A 1 - HOUR		M A X I M A 24 - HOUR						
LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD	2ND MM/DD	3RD MM/DD	4TH MM/DD	MEAN	1HR #>150	24HR #>65
Beulah - North	2000	OCT-DEC	2198	144.3 11/29/15	126.9 11/29/14	33.4 11/29	24.9 11/07	17.2 10/13	10.9 12/20	5.6		
Fargo NW	2000	OCT-DEC	2198	40.4 02/31/9	29.0 02/31/7	10.5 02/22	10.4 02/32	10.3 21/42	10.1 01/22	3.8		

The maximum 1-hour concentration is 144.3 µg/m3 at Beulah - North on 11/29/15
The highest 24-hour concentration is 33.4 µg/m3 at Beulah - North on 11/29

* The ambient air quality standards are:
FEDERAL Standards -
1) 24-hour: 3-year average of 98th percentiles not to exceed 65 $\mu g/m^3$.
2) Annual: 3-year average not to exceed 15 $\mu g/m^3$.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable FRM $PM_{2.5}$ Particulates ($\mu g/m^3$)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAX 24-HOUR 1ST MM/DD	MAX 24-HOUR 2ND MM/DD	MAX 24-HOUR 3RD MM/DD	ARITH MEAN	#> 65	AM>15	% >MDV
Beulah - North	2000	OCT-DEC	15	3.2	11.5 12/20	10.7 12/14	8.8 12/26	6.3			100.0
Bismarck Residential	2000	OCT-DEC	30	2.1	11.8 11/14	11.5 11/26	11.4 11/23	7.1			100.0
Dickinson Residential	2000	OCT-DEC	15	2.0	8.0 12/08	7.4 12/14	6.8 11/14	5.1			100.0
Fargo NW	2000	OCT-DEC	27	1.8	20.8 10/30	17.4 10/24	13.7 12/02	7.4			92.5
Grand Forks - North	2000	OCT-DEC	26	2.0	27.5 12/14	22.1 10/30	21.9 10/24	9.3			100.0
Sharon	2000	OCT-DEC	14	1.0	13.2 12/15	12.2 10/15	9.7 11/14	6.1			85.7
TRNP - SU (Painted Canyon)	2000	OCT-DEC	15	1.9	7.0 12/14	6.9 11/14	6.8 11/20	4.5			93.3

The maximum 24-hour concentration is 27.5 µg/m3 at Grand Forks - North on 12/14

* The ambient air quality standards are:
FEDERAL Standards -
1) 24-hour: 3-year average of 98th percentiles not to exceed 65 $\mu g/m^3$.
2) Annual: 3-year average not to exceed 15 $\mu g/m^3$.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable PM_{10} Particulates ($\mu g/m^3$)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAXIMUM 24 - HOUR 1ST MM/DD	2ND MM/DD	3RD MM/DD	ARITH MEAN	#>150	AM>50	% >MDV
Dragswolf	2000	OCT-DEC	15	0.8	15.1 10/21	8.3 10/09	6.2 12/14	4.3			46.6
Fargo NW	2000	OCT-DEC	15	3.6	25.4 12/14	24.3 10/09	23.0 10/03	14.7			93.3
White Shield	2000	OCT-DEC	15	1.5	23.3 10/21	15.4 12/20	11.1 12/14	6.8			73.3

The maximum 24-hour concentration is 25.4 $\mu g/m3$ at Fargo NW on 12/14

* The STATE and FEDERAL air quality standards are:
1) 150 $\mu g/m^3$ maximum averaged over a 24-hour period with no more than one expected exceedance per year.
2) 50 $\mu g/m^3$ expected annual arithmetic mean.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable PM_{10} Sulfates ($\mu g/m^3$)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAXIMUM 24 - HOUR 1ST MM/DD	2ND MM/DD	3RD MM/DD	ARITH MEAN	#>15.	AM>5.	% >MDV
Fargo NW	2000	OCT-DEC	15	0.5	3.7 12/14	2.5 11/14	2.3 12/26	1.3			100.0

The maximum 24-hour concentration is 3.7 $\mu g/m3$ at Fargo NW on 12/14

* No standard is currently in effect.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : PM_{10} Sulfate/PM_{10} Total Mass Ratio (Percentage)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAX 1ST MM/DD	MAX 2ND MM/DD	MAX 3RD MM/DD	ARITH MEAN
Fargo NW	2000	OCT-DEC	14	2.8	19.7 12/26	16.6 11/14	14.7 10/27	9.7

The maximum 24-hour ratio is 19.7 percent at Fargo NW on 12/26

* No standard is currently in effect.

SECTION THREE

EXCEEDANCE LISTINGS

By Site Date Hour

All Units Are in Parts Per Billion Except Wind Direction (Degrees),
Wind Speed (MPH), CO (PPM), and $PM_{2.5}$ and PM_{10} ($\mu g/m^3$)

The * Identifies the Exceedances

NONE

By Date Hour Site

All Units Are in Parts Per Billion Except Wind Direction (Degrees),
Wind Speed (MPH), CO (PPM), and $PM_{2.5}$ and PM_{10} ($\mu g/m^3$)

The * Identifies the Exceedances

NONE